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ABSTRACT

This final report of a comprehensive five-year evaluation process focused on examining the progress of the statewide implementation of Internet technology, as well as the general impact on teachers, students, and schools of statewide connectivity and training efforts in K-12 schools in Nebraska. The evaluation process was based on three primary types of data--teacher/principal survey data, machine-based Educational Service Unit (ESU) support data, and observed classroom uses and projects. Results are reported in the following areas: teacher use of the Internet; principal use of the Internet; student use of the Internet; the impact of Internet on classroom settings; example teacher statements related to their use of the Internet; and general implications of the Internet implementation efforts. The following general implications revealed by the evaluation process are summarized: (1) significant progress has been made in the process of connecting schools and classrooms to the Internet; (2) teachers and students are using the resources on the Internet in day-to-day classroom operations; (3) the Internet is becoming a valued tool for educators and students; (4) community interest is starting to parallel educational interest; (5) statewide dialogue, cooperation, and planning are becoming increasingly important; and (6) Nebraska continues to play a national leadership role. (DLS)

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Nebraska Internet Evaluation Report
Year 5

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INTRODUCTION

The Internet, the international network of computer networks, is an exciting addition to K-12 schools. Both world-wide communication and information gathering is possible using this one source. Nebraska and its educational community are well into the process of connecting to this resource, as directed by LB 452 (1993) and LB 860 (1996). Educational Service Unit servers located across the state, provide access to the Internet for almost all public K-12 schools. In addition, educators throughout the state have been trained to effectively use the Internet to improve the overall education and learning environment of Nebraska students. An evaluation team from the University of Nebraska at Omaha, in cooperation with the ESUs, is investigating the impact of the state-wide effort to connect schools and teachers to the Internet. This summary is a final report of a comprehensive 5 year evaluation process, which focused on examining the progress of the statewide implementation, as well as the general impact on teachers, students, and schools of these extensive statewide connectivity and training efforts.

THE 1998 EVALUATION PROCESS

The evaluation process has completed its fifth and is essentially that of an "impact analysis." The evaluation design was focused on research based questions which sought to determine the general impact of the Internet training of teachers, facilitated by the Educational Service Units, on K-12 education in Nebraska, or specifically on teachers and their students in the classroom. Within this evaluation, three primary types of data were examined related to the research questions. These data types included 1) teacher survey data, 2) machine based ESU support data, and 3) observed classroom uses and projects. Recent data included a web–based survey instrument administered in May 1998, which examined responses from 1,539 Nebraska teachers who completed the survey. To enhance the external validity of the evaluation, all 929 teachers within a seven county region were also surveyed. The observed classroom uses included teacher interviews and an examination of key technology integration projects happening in the state. Each of the data sources were examined for related implications, with cross-referencing among sources also conducted. The following are some of the observations and implications of this evaluation.

CONNECTIVITY IN SCHOOLS

The goal of connecting all Nebraska school rooms to the Internet is very close to being achieved. As of December 1, 1998, over 88% of the states school buildings and classrooms have direct connected computers, and all school districts (excluding Class I districts) have a direct connection to the Internet in at least one building. Almost all educators in the state have access to the Internet, and over 60% of the state's educators use the Internet at least weekly.

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TEACHER USE OF THE INTERNET

The next step in the use of Internet in schools focused on teachers use of the Internet and their understanding of the value of its resources, both for teachers and for students. The results of this evaluation show that teachers are not only using the Internet more, they are also becoming more comfortable with integrating Internet resources into their classroom activities.

1) **Nebraska teachers are increasing their use of Internet each year**. The data from responding web using teachers in the May 1998 survey indicated that over 80% used email daily and over 96% used email at least weekly. Even when all the teachers in the seven counties were surveyed, the data showed 64% used the email at least weekly. Use of the web is also increasing, with over 89% indicating that they use the web at least weekly.

2) **Teachers are indicating that they are becoming more comfortable with integrating Internet**, with over 69% of the surveyed teachers agreeing with a survey item, "I feel comfortable with designing lessons that integrate Internet." Teachers from around the state show that they are eager to learn more about effective strategies to infuse the Internet into their curriculum, as shown by the large number of staff development sessions held in the past few years, as well as the attendance count of 950 educators at the annual Midwest Internet Institute held in Lincoln in early August.

PRINCIPAL USE OF THE INTERNET

A statewide survey was also conducted involving 291 principals within the state of Nebraska. This survey, along with administrator related survey items from the teacher survey, had several implications.

1) **Principal support is building for using the Internet with students**. As the instructional leader of a school, principal encouragement to use an instructional tool is important. Only 1% of the teacher respondents in 1998 indicated that their principal did <u>not</u> encourage them to use Internet with students, a considerable reduction from the 19% of teacher respondents in 1997.

2) **Schools are connected.** In verification of school access to the Internet, 99.7% of the principals (290 out of 291) reported that their school was connected to the Internet.

3) **The use of electronic mail was seen as an "essential" component of principal Internet use**, with 88.7% of the principals reporting that the use of electronic mail is now "very important" or "somewhat important" to their current job activities.

4) **The use of the World Wide Web was seen as growing in importance**, with 97.6% of the principals reporting that the World Wide Web would be an important tool for them within the next five years.

5) **Principals were still concerned about potential student access to inappropriate materials** on the Internet, with 41% of the principals reporting at least some level of concern.

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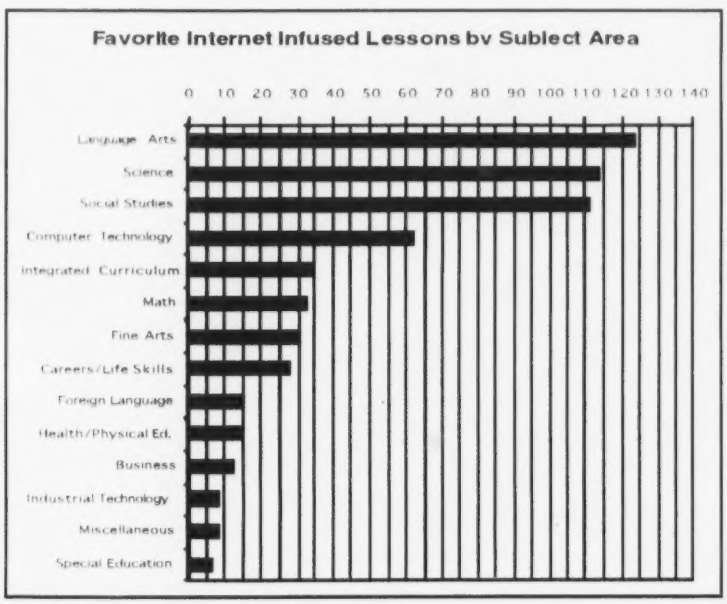
STUDENT USE OF THE INTERNET

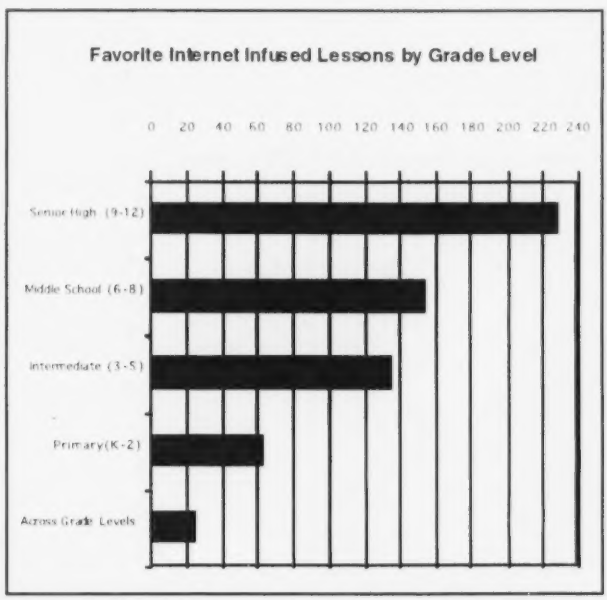
The use of Internet in classrooms by students seems to be the final goal of most innovative educators. Much progress has been seen in this area in the past few years, mainly due to four factors. 1) Teachers are becoming more comfortable and knowledgeable about the resources on the Internet, 2) effective strategies are being developed to infuse Internet into the curriculum, 3) students are becoming very proficient in using the Internet, and 4) more Internet-connected computers are becoming available in most schools and the connections are becoming faster.

Indicators of this increased use come from many data sources. Also, the data indicates that teachers are not only increasing student use, but also developing more innovative strategies for the use of the Internet in the learning process.

1) **Student use is increasing**. Almost 80% of the respondents reported that they had their students use Internet. This is about a 20% increase over last year's responses. The reasons for not using Internet with students were lack of available Internet-connected computers and incomplete or evolving school district policy on student use. It should be noted that few stated that "the Internet was of little value in my classes."

2) **Internet is being used in all subject areas and at all grade levels**. Over 600 Internet infused lesson plans were submitted by Nebraska teachers in the May 1998 survey and all subject areas and all grade levels were represented. The following graphs indicate the subject area and grade breakdown of those favorite lessons.




Favorite Internet Infused Lessons by Grade Level
0 20 40 60 80 100 120 140 160 180 200 220 240
Senior High (9-12)
Middle School (6-8)
Intermediate (3-5)
Primary(K-2)
Across Grade Levels

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3) **The impact of Internet on student learning seems positive**. As with any new tool used in classrooms, the value of the innovation must be constantly evaluated. Although it is very difficult to measure the impact of Internet on student progress, the 929 teachers of the 1998 survey indicated that they felt Internet use had a positive impact on classroom activities, as the data are reported in the following table.

Survey Item #34. "When my student use Internet for course assignments:"

Strongly Agree – 1 Agree – 2 Disagree – 3 Strongly Disagree – 4

	Mean
students are more motivated	1.7
there is a positive impact on learning	1.7
the teacher becomes more of a guide	1.8
student products are better	2.0
student use inappropriate sites	3.0
there are more discipline problems	3.1
plagiarism is more of a problem	2.4

IMPACT OF INTERNET ON CLASSROOM SETTINGS

After surveying teachers for five years, interviewing hundreds of educators, and visiting over 300 classrooms, the evaluation team has identified the following items as ways Internet seems to be impacting student learning environment in Internet infused classrooms throughout the state of Nebraska.

1) **Student use appears to be a critical component to "innovative" curricular use.** The most impressive and effective curricular uses of the Internet observed in classrooms identified by other teachers as "innovative," typically involved putting the students on-line for the majority of the classroom's Internet based activities. This included having the students do the research, help plan the activity, and even do routine typing tasks. The classroom enthusiasm of "involved" and "motivated" students was often one of the most observable aspects of the more "innovative" classrooms, and was often identified by teachers as a major outcome related to the Internet use by students.

2) **Innovative uses often blend the Internet into other curricular activities**. Many of the most innovative and effective uses of the Internet access the Internet as one of several educational technology tools, in the support of more traditional curricular goals (learning about geometry in math, learning about the weather in science, etc.). It appears that the many effective uses of the Internet involve the use of this network as a relatively "transparent" resource in the teaching and learning process. It was also interesting that in this task oriented environment, teachers appeared to have relatively little concern for the possibility of students accessing offensive material.

3) **Internet is often used in multi-disciplined projects.** Many Internet infused lesson units include the blending of two or more disciplines, using constructivist and "real world" teaching learning strategies. Many Nebraska teachers are using established state and national Internet based collaborative projects. Examples, addresses and description of national projects are given below.

NASA KidSat – http://www.jpl.nasa.gov/kidsat
A three-year program to bring space exploration into classrooms through the Internet that allows students to "target" a camera the space shuttle. Students use the images to study the earth's environment.

The JASON Project – http://www.jasonproject.org/
Via technology, students follow explorer Robert Ballard on a year-round scientific exploration.

Iditarod sled Dog Race Official 1999 Website – http://www.iditarod.org/
Students follow the race, it's contestants and teachers can the race into many subject area curriculum.

Journey North – http://www.learner.org.jnorth
A science education program that uses the Internet to track migration and signs of spring.

Telescopes in Education – http://www.mtwilson.edu/.MWO/Science/TIE/
Students access a telescope from Mt. Wilson, outside of Los Angeles, California to study space exploration.

Weather Channel Homepage – http://www.weather.com/twc/homepage.twc
Lesson plans, experiments and hands-on activities that cover the hows, whys and wonders of weather.

Voyage of the Mimi – http://www.nysunburst.com/mimi.html
An interdisciplinary, thematic, multi-media approach to teaching and learning through the voyages of the Mimi.

MayaQuest – http://www.mecc.com/
Allows students and educators to diagnose weak skill areas and prescribes lesson plans to help students reach grade level mastery.

4) **Multicultural resources available on the Internet are important**. Many teachers are particularly excited about the potential for the Internet to help support the multicultural goals of schools. Several teachers remarked that by using the Internet, it is much easier for particular disciplines to find lessons that blend multicultural aspects with traditional discipline related topics. For instance, one mathematics teacher was using paintings from several different countries, accessed over the Internet, to help teach the geometric concept of tessellations, as well as talk about the use of geometry in other cultures.

5) **Student "research" using the Internet appears to be at a considerably higher level** than in more traditional classroom activities. This type of research appears to be much richer than more traditional school library based research. Often, classes not only retrieved textual information, but accessed and incorporated information from visual images (such as NASA moon images, or artworks from National galleries), on-line software programs (such as physics ray tracing, or biology frog dissection programs), and even communicated with on-line experts (such as a genetics scientist). The concept of "student research" seemed to be more dynamic, and teachers reported that even the word "research" appeared to be used more commonly by students. In addition, the Internet research appeared to be more interactive, with students sharing information as well as retrieving it (such as when talking to content experts, or students at other sites).

6) **Innovative classroom uses often accessed "non-traditional" classroom resources.** Most of the innovative classroom activities related to the Internet accessed information which was not typically available in other mediums or school based library resources. For example, current pictures of Jupiter were downloaded by an elementary science class, and daily White House schedules were accessed by a high school social studies class. In some classroom activities, these "non-traditional" resources also included students in other countries, such as Russia, Finland, and Australia. Thus, many of the innovative classroom uses involved using the Internet to secure information not available, or not readily available, from traditional sources, such as the school textbook or library resources. In addition, resources from the traditional sources seemed to be used effectively and wisely.

7) **Teacher and school based grant opportunities appear to be an important catalyst to innovation.** Many of the teachers involved in the most innovative and extensive Internet infused classroom examples were involved in projects funded by grants. These grants included national funders, such as the three US Dept. of Education Technology Innovation Challenge grants, as well as National Science Foundation grants, regional grants, such as the US West Project, and state funders, such as the Excellence in Education grants.

EXAMPLE TEACHER STATEMENTS RELATED TO THEIR USE OF THE INTERNET
Many of the teachers across the state of Nebraska had considerable stories based upon their use of the Internet in the classroom. Several of these are represented here, to represent the wide variety of Internet uses and outcomes observed within the evaluation process.

"I found a career interest inventory homepage via the high school's Counseling Center homepage. Students were able to access a career interest inventory in order to find out more about how their personal interests, abilities, aptitudes, and personality traits matched up with certain career possibilities. The program calculated a top ten list of careers for each student based on the input that they themselves provided. It proved to be motivating, revealing, and fun for all of the students. I would highly recommend it."
9th grade English teacher

"There was this Groundhog Project 1998 that my class was involved in. It dealt with learning about weather, etc. It tied into almost every aspect of the curriculum. We were on teams with various schools around the world!!! We contacted each other regularly via e-mail and the Internet. It was absolutely great! I only wish I knew more about creating web pages for our school."
1st grade teacher

"Student lab groups formed companies to manufacture a good bar of soap. They searched the Internet to learn how to make the soap, then made it, graded each other's product, etc. They also made logos for the wrapper of their soap. Next year we will do this together with the business department when they do the marketing project. The business students will develop videos for the advertising the soap."
11th grade Chemistry teacher

"I teach Title 1 Reading, Math, and work with ESL students. The Air Guard works with selected classroom students and teachers. The kids correspond with a teddy bear that travels all over the world, wherever the Guard is assigned. Guard members return e-mail messages, and provide cultural, economic, political, geographical, and historical information to the students. The students use this information to study Language Arts, Science, Mathematics, and Social Studies.
Middle School ESL Teacher

"I have been teaching for 30 years and I am convinced that technology/computers, and especially the Internet are unquestionably the only tool in education that has made such a profound difference in my teaching-and student learning."
5th grade teacher

"The biggest difference between completing my project with the Internet, and pencil and paper is that paper and pencil is boring. On the computer you have fun and learn....." 4th grade student

GENERAL IMPLICATIONS OF THE INTERNET IMPLEMENTATION EFFORTS
Several general implications are also apparent from the evaluation process in this final year of the 5 year evaluation.

1) **Significant progress has been made in the process of connecting schools and classrooms to the Internet,** with assistance from measures such as LB 452 and LB 850. Connecting every classroom in the state with a high speed connection is a worthy goal and efforts need to continue to meet that goal.

2) **Teachers and students are using the resources on the Internet** in day to day classroom operations. Continued staff development in effective use of the Internet in a vibrant, well coordinated curriculum, should be emphasized by schools, ESUs and teacher preparation institutions.

3) **Internet is becoming a valued tool for educators and students, similarly to the importance to the nations society in general.**

4) **Community interest is starting to parallel educational interest.**

5) **Statewide dialogue, cooperation, and planning are becoming increasingly important** as schools and teachers continually adapt to fast changing technologies.

6) **Nebraska continues to play a national leadership role,** for example, a recent Education Week Report (1998) listed Nebraska at the top state for use of the Internet in education.

SUMMARY
In summary, it was apparent from these evaluation implications that Nebraska has made excellent progress in their effort to integrate the Internet into the K-12 schools. It should be noted that the effort is ongoing and will continue to be a challenge that needs to be addressed in the state. Connectivity and the use of connected computers will both continue to change, as technology is causing change in all of our society. The continued high level of cooperation between many state institutions would seem critical to continued progress in the state. Based upon a review of the relevant literature and status reports from other states, it is also clear that Nebraska is well ahead of a considerable majority of states in bringing the Internet into the K-12 classroom.

Additional information associated with this report can be requested from the following:
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